As mentioned previously, the primary purpose of the LBC method is to calculate a lime recommendation, but it can also be useful for other purposes. Since the LBC Method directly measures soil acidity, it can be used in a calculation, along with soil test calcium, magnesium, and potassium values to provide a reasonable estimate of soil cation exchange capacity. The measurement of LBC will not change appreciably over time because soil levels of clay and organic matter remain about the same from year to year in typical agronomic farming operations. Therefore, the LBC does not need to be measured annually to calculate a cation exchange capacity for a field or field area. For soils amended with heavy applications of organic materials (gardens, potting soils, flower beds, etc.), annual measurements would be needed to calculate the cation exchange capacity.
Measurement of Lime Buffer Capacity

Soil pH is an important chemical property because it influences the availability of soil nutrients for plant uptake and it affects a crop’s root system development. Soil pH also indicates whether lime is needed to correct toxicities caused by aluminum and manganese, or to increase calcium levels in the soil. But pH alone does not indicate how much lime is needed because soils vary in their soil pH buffering capacities, i.e. a soil’s resistance to a change in pH (the amount of soil acidity that must be neutralized to raise pH to any given level). Most soil testing laboratories make lime recommendations from a calibration based on soil pH and a buffer pH measurement, but they do not directly measure the acidity that must be neutralized by lime application. A new method, introduced below, measures the buffering capacity directly.

The new Lime Buffer Capacity (LBC) method.

Most buffers contain some toxic chemicals; therefore, many labs are looking for alternatives to determine the lime requirement of soils. Through research at the University of Georgia, a new automated method that uses non-toxic chemicals has been developed to measure a soil’s Lime Buffer Capacity (LBC). The measurement is carried out using a new robotic measurement system that automatically adds fast acting lime (calcium hydroxide) to soil samples with an equivalent water pH less than 6.0 or pH 5.4 when measured in a dilute calcium chloride solution (see Soil Testing circular “Soil pH and Salt Concentration”).

Lime Recommendation:

The primary purpose of the LBC Method is to calculate a lime recommendation. A lime recommendation is calculated based on three factors: 1) the soil’s initial pH in a dilute solution of calcium chloride, 2) the desired pH for the field or soil area being analyzed, and 3) the soil’s LBC, which is calculated from the change in pH from adding the fast acting lime to the soil. Lime recommendations are typically for an 8 inch depth of soil. In this case, the lime recommendation is:

\[ \text{Lbs ag lime per acre} = \text{LBC} \times (\text{target pH} - \text{pH CaCl}_2) \times 4 \]

How much does LBC vary among soils?

The LBC varies primarily because of differences in the soil organic matter and clay contents of soils. We have found the LBC to vary as much as tenfold within crop production fields in South Georgia, depending on field location. The differences in LBC of two soils are illustrated in the graph. Soil A has a LBC of five times that of soil B. The soil with the lower LBC is lower in organic matter and sandier. It has a lower cation exchange capacity (CEC).